



#### THREE SAMPLING EVENTS HAVE BEEN DONE

**DURING THE YEAR 2015:** 

- 1. Spring Sampling 2015 (May)
- 2. Summer Sampling 2015 (July)
- 3. Fall Sampling 2015 (September)

In addition, heavy metal analysis was performed in September 2015 on samples from a LOW CONDUCTIVITY site compared to the sites with HIGH CONDUCTIVITY.

#### RESULTS

	MAY		JULY		SEPTEMBER						
Site	E. coli (MPN/100mL)	Conduct (uMhos)	E. coli (MPN/100mL)	Conduct (uMhos)	E. coli (MPN/100mL)	Conduct (uMhos)	As (ug/L)	Cd (ug/L)	Pb (ug/L)	Se (ug/L)	Ag (ug/L)
#26	687**	280	n/a	n/a	488**	380	n/a	n/a	n/a	n/a	n/a
#142	276**	145	381**	140	2420**	165	n/a	n/a	n/a	n/a	n/a
#143	291**	123	>2420**	100	276**	180	<.01	<.002	<.01	<.01	<.002
#3071	517**	1080@	n/a	n/a	727**	1330@	<.01	<.002	<.01	<.01	<.002
#3072	770**	400	n/a	n/a	1203**	550@	n/a	n/a	n/a	n/a	n/a
#3073	308**	960@	n/a	n/a	1733**	1020@	<.01	<.002	<.01	<.01	<.002
#3104	579**	1360@	n/a	n/a	548**	1570@	<.01	<.002	<.01	<.01	<.002
#3176	n/a	n/a	n/a	n/a	225*	430	<.01	<.002	<.01	<.01	<.002
#3423	n/a	n/a	n/a	n/a	> 2420**	330	n/a	n/a	n/a	n/a	n/a
#3424	n/a	n/a	n/a	n/a	435**	630@	n/a	n/a	n/a	n/a	n/a

<sup>\*</sup>Above the chronic value for E. coli (130MPN/100mL); \*\* Above the acute value (240MPN/100mL) @ Above the criteria (150-500uMhos) for supportive conductivity for aquatic life.





#### Table 2. Locations with high *E. coli* concentrations

Location	MAY 2015	JULY 2015	SEPTEMBER 2015	Note
Id#26: Greasy Creek, Meade Memorial School, Johnson County. (Erica Taylor-Reynolds)	687**	n/a	488**	Acute **)
<b>Id#142</b> : Big Caney Creek, just above the low water bridge Binion Ford Rd., Elliot County. (Doug Doerrfeld)	276**	381**	211*	Chronic *) Acute **)
Id#143: Laurel Creek, just above the low water bridge on Stegal Cold Spring Rd., Elliot County. (Doug Doerrfeld)	291**	>2420**	276**	Acute **)
Id#3071: Little Black Log, next to Sheldon Clark HS, Martin County. (Nina McCoy)	517**	n/a	727**	Acute **)
Id#3072: Black Log Creek, between Sheldon Clark HS Football Field and the Vocational School, Martin County. (Nina McCoy)	770**	n/a	1203**	Acute **)
Id#3073: Rockcastle Creek, behind the Court House Annex on Main St., Martin County. (Nina McCoy)	308**	n/a	1733**	Acute **)
Id#3104: Middle Fork Rock Castle, St. Stephen Catholic Mission, Martin County. (Nina McCoy)	579**	n/a	548*	Acute **)
Id#3176: Left Fork of Nats Creek. Across from Richardson Primitive Baptist Church on Hwy 2033., Lawrence Co, Martin County. (Carolyn Bentley)	n/a	n/a	225*	Chronic *)
<b>Id#3423</b> : Near mouth above culvert where George Branch Road crosses creek near white farm house, Floyd Co. (Evan Smith)	n/a	n/a	>2420**	Acute **)
Id#3424: Near mouth and above bridge at the Floyd/Johnson County line, Floyd Co. (Evan Smith)	n/a	n/a	435**	Acute **)

### CORRELATION BETWEEN E. COLI AND HUMAN HEALTH

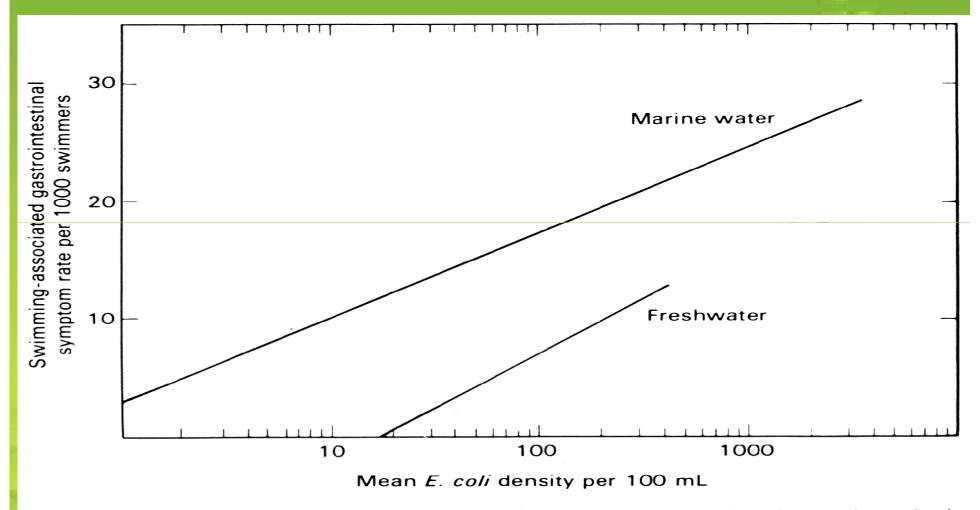


Figure 10. Marine and freshwater criteria for swimming-associated gastrointestinal illness and water quality using *E. coli* to measure the water quality. (Marine data obtained from Table 9, Reference 6.)

### DOES THE *E. COLI* IN THE CREEK COME FROM HUMAN OR ANIMAL SOURCES?

- 1. DNA TEST
- 2. ENVIRONMENTAL PROFILE / OBSERVATION AROUND THE SAMPLING SITES (I.E., FARMING ACTIVITIES)

# ACTIONS TO REDUCE E. COLI CONCENTRATION AND MINIMIZE THE RISK OF ACCIDENTAL HEALTH PROBLEM?:

- 1. POSTING AN INFORMATION (SIGN)?
- 2. GRANT PROPOSAL?



#### Table 3. Locations with high conductivity

Location	MAY 2015	JULY 2015	SEPTEMBER 2015	Note (Criteria)
Id#3071: Little Black Log, next to Sheldon Clark HS, Martin County. (Nina McCoy)	1080*	n/a	1330*	Conductivity between 150 – 500 is best for diverse aquatic life
Id#3072: Black Log Creek, between Sheldon Clark HS Football Field and the Vocational School, Martin County. (Nina McCoy)	400	n/a	550*	Conductivity between 150 – 500 is best for diverse aquatic life
Id#3073: Rockcastle Creek, behind the Court House Annex on Main St., Martin County. (Nina McCoy)	960*	n/a	1020*	Conductivity between 150 – 500 is best for diverse aquatic life
Id#3104: Middle Fork Rock Castle, St. Stephen Catholic Mission, Martin County. (Nina McCoy)	1360*	n/a	1570*	Conductivity between 150 – 500 is best for diverse aquatic life
Id#3424: Near mouth and above bridge at the Floyd/Johnson County line, Floyd Co. (Evan Smith)	n/a	n/a	630*	Conductivity between 150 – 500 is best for diverse aquatic life

# DOES HIGH CONDUCTIVITY COME FROM MINING, HUMAN ACTIVITIES, OR NATURAL?

- 1. METAL TESTING (2011) AND HEAVY METAL TESTING (2011 AND 2015)?
- 2. ENVIRONMENTAL PROFILE / OBSERVATION AROUND THE SAMPLING SITES (I.E., MINING AND FARMING ACTIVITIES)
- 3. ANALYSIS OF METAL IN SOIL SAMPLES (I.E., TO SEE CORRELATION BETWEEN METALS IN THE SOIL AND IN THE CREEK/WATER)

## TABLE 4 RESULT 2011 METAL TESTING (mg/l) FOR LOCATIONS WITH HIGH CONDUCTIVITY

LOCATION	Ca	Mg	K	Si	Na	S	Sr	NOTE
Id#3073: Rock Castle Creek Behind the Court House, Martin County	103	79.1	6.81	2.77	22.2	134	0.75	Priority pollutants such as: Be, Cd, Cr, Cu, Pb, Ni, and Ag are under detection limits.
Id#3074: Rock Castle Creek, beside Green Bottom Trailer Park, Martin County	115	71.8	8.28	2.9	84.8	155	1.21	Priority pollutants such as: Be, Cd, Cr, Cu, Pb, Ni, and Ag are under detection limits.
Id#3104: Middle Fork Rock Castle, St. Stephen Cath. Mission, Martin County	124	66.1	9.78	2.72	158	174	1.56	Priority pollutants such as: Be, Cd, Cr, Cu, Pb, Ni, and Ag are under detection limits.

# MY SCIENTIFIC GUESS ABOUT HIGH CONDUCTIVITY ON THE SAMPLING LOCATIONS:

- 1. BASED ON METAL ANALYSIS: MOST LIKELY IT WAS NOT CAUSED BY MINING ACTIVITIES.
- BASED ON CONNECTION WITH E. COLI RESULTS: MOST LIKELY IT WAS NOT CAUSED BY HUMAN (FARMING) ACTIVITIES.
- 3. IT IS VERY LIKELY CAUSED BY NATURAL PROCESSES (I.E., LEACHING FROM SOILS → NEED TO BE PROVEN BY ANALYSIS OF METAL IN SOIL SAMPLES).

#### WHAT NEXT?

- Continue with scheduled sampling events to make sure that <u>our water</u> has no problems with pollution.
- Follow up with DNA-testing / environmental profiling for locations with high *E. coli* concentration to identify the source whether the *E. coli* are from animal (cattle) or human sources.

Follow up with metal analysis in soil samples from location with high conductivity.

